



NEW IDEAS FOR THE MILLENNIUM

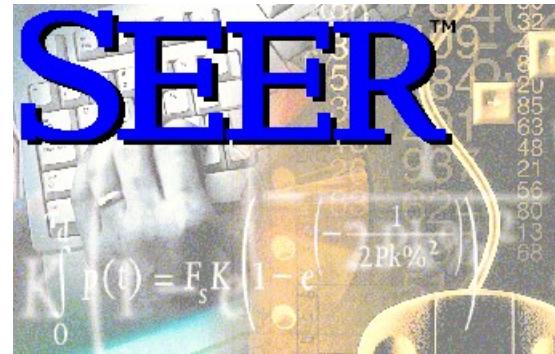


G A L O R A T H

# DCMC Pricing and Negotiation Conference

**“Paying The Right Price” Through  
Parametric Estimation Modeling**

**Dan Galorath, June 2000**



# Two Kinds of Parametrics Models

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- **Macro level Parametrics (SEER-H, PRICE-H)**
- **Estimates Based On High Level Information Such As Weight, Boards, Etc.**
- **Quicker than Manual Methods**
- **Able To Estimate Without Cost Data**
  - Development, Production, Logistics, Operations, & Support All Handled In One Model (SEER-H)
  - Can Be Calibrated Against Actuals
- **Detailed Level Parametrics (SEER-DFM)**
- **To Understand “Should Cost” Tradeoffs & Potential Reductions**
- **Models Specific Manufacturing Issues**
  - Details Including Specific Assembly Issues, Specific Materials, Process Selection, etc. (Insertion Methods)
  - Often Called Bottoms Up Parametrics
  - Cost Based On The Work That Must Be Performed
  - Cost Tradeoffs Based On Very Specific Manufacturing Issues (These Cannot Be Fully Understood By Calibration of Macro Level “H” Models)
  - Much More Rapid Piece Parts Quotes From Subs
  - Repeatable

# Cost Model Input Parameter Granularity Must Address Estimating Requirements

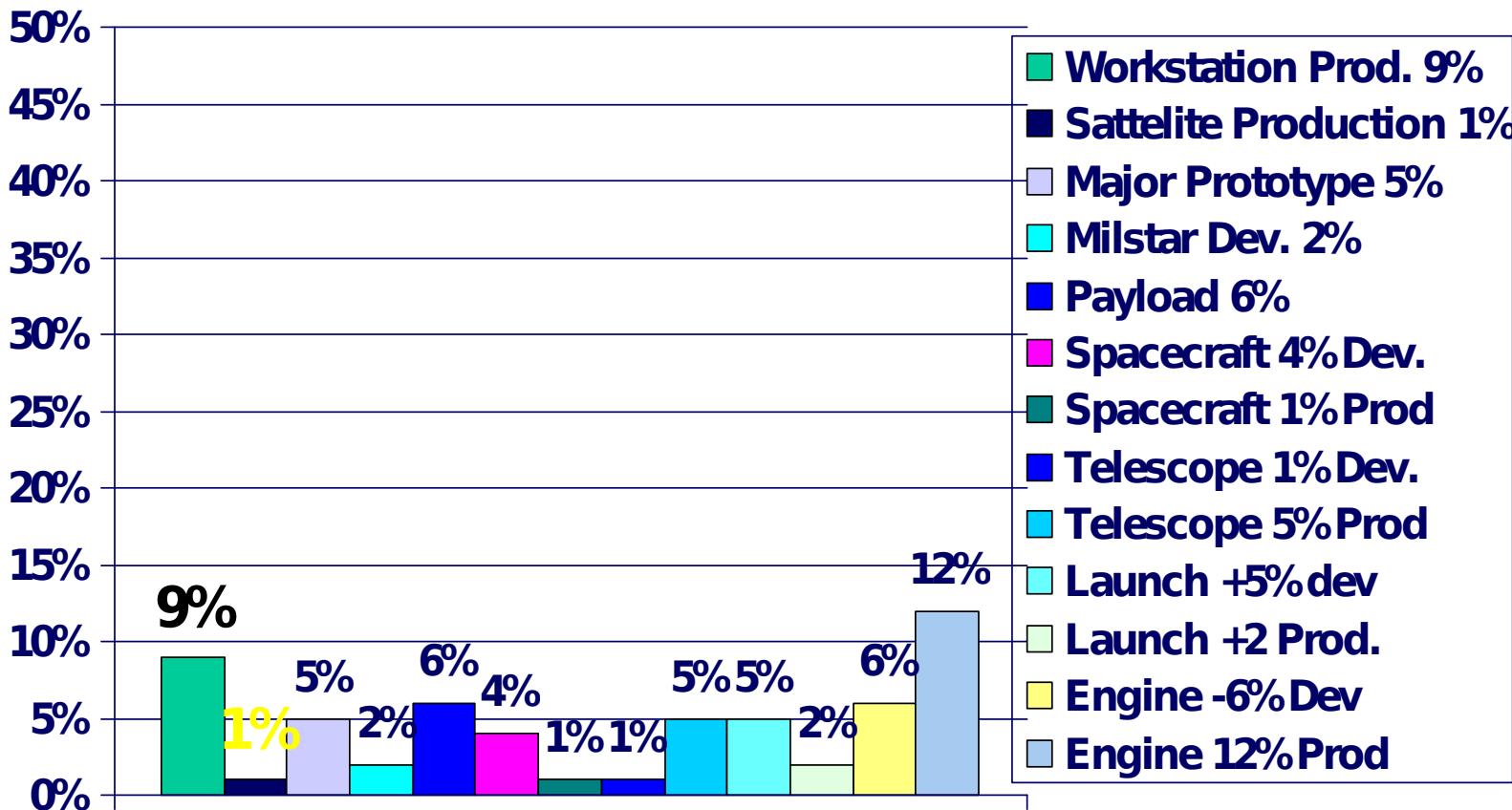


# Parametrics As A Basis Of Negotiation Example

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- **Buying Organization's Estimate Was \$130,000 Less Than Bid For A Part**
- **Contractor Was Asked To Justify the Cost Difference**
- **Contractor Was Unable To Do So**
- **Result... \$130,000 Reduction In Price**
- **Why Did This Work**
  - Buying Organization Had Experience With SEER Model
    - Found Accurate In Estimating
    - Buying Organization Was Able To Model Part Specific Characteristics
  - The Buyer and Supplier Were Able To View The Problem In Terms Of Its Characteristics

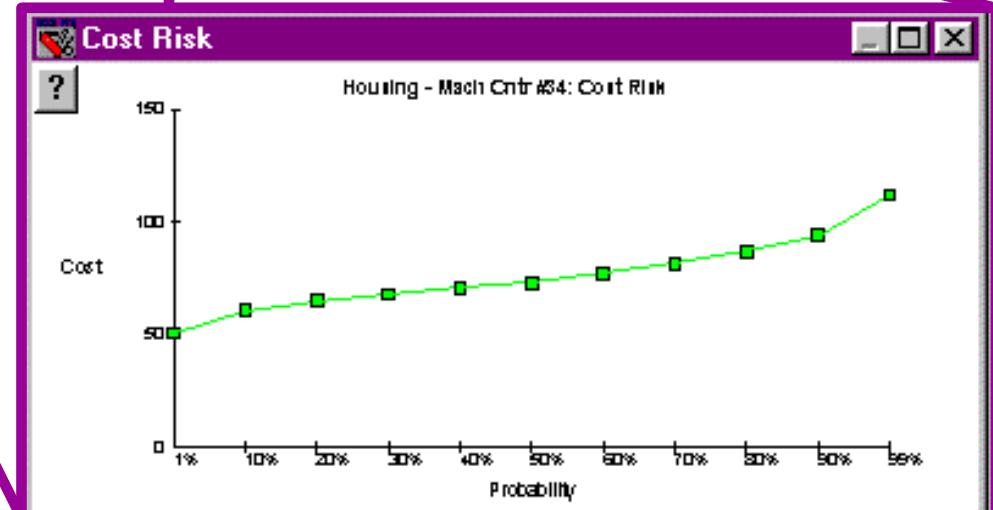
# SEER-H Provides Accurate System Estimates



# Should Cost Tradeoffs Must Account For Risk & Uncertainty

- + PRODUCT DESCRIPTION
  - Material Origin
  - Production Quantity
  - Quantity Per Next Higher Assembly
  - Hourly Labor Rate
  - Production Experience/Optimization
  - Manufacturing Environment
  - Material Selection
  - Raw Sandcast Part Cost (Optional)
  - Finished Weight (lb) **300.0000 340.0000 380.0000**
  - Shape
  - Dimensions (in)
- + OPERATIONS
  - Mill Locating Pad (Radial Mill Rough)
  - Rough Front Mtg. Flg (End Mill Rough)
  - Finish Front Mtg Flg (End Mill Finish)
  - Drill Mtg Holes (Drill)
  - Tap Mtg Holes (Tap)
  - Bore Pilot Hole (Bore Finish)
  - Drill Holes (Drill)
  - Tap Holes (Tap)
  - Ream Holes (Ream)
  - Operation (Next)
- + MANUFACTURING DESCRIPTION
  - Tooling Type
  - Tooling Complexity
  - Machine Tool Condition
- + OPTIONAL COST INPUTS
  - Tooling Cost (Optional)
  - Tooling Amort. Quantity (Optional)
  - Other Cost (Optional)
- + LABOR CALIBRATION
  - Start Learning (Optional)
  - Stop Learning (Optional)
- PROBABILITY (RISK) **50.00%**

	<b>Sand Casting</b>		
	2,000	1	EHi
Low	54.00	Hi	
	Consumer		
	<b>Grey Cast Irons</b>		
	0.0000		
	<b>Irregular Cross Section</b>		
	0.000	0.000	
	0.0100	0.00	
7	<b>0.7500</b>		
7			
0.0050	0.00		
19	<b>1.2500</b>		
11			
8			
	Hi	Hi	
	Low	Low	
	Nom	Nom	
	<b>2,500.00</b>		
	5,000		
	<b>700.00</b>		
	1,00		
	<b>10,000</b>		
	0		
	50.00%		



# Macro Level “H” Models Vs Part Specific Model

## One Boeing Seattle Prospective

- Boeing Seattle Finds Using Both “H” Models And SEER-DFM They Get The Full Cost Picture and Save The Government Money
- Macro Level H Models Start With High level Information Such As Weight and General Material Type
  - Output Cost, Labor, Materials, O&S Costs
  - Even With Calibration, Macro Level “H” Models Can’t Do The Detailed Engineering/Cost Tradeoffs
- Use SEER-DFM For Trades & Detailed Analysis
  - Example: Part Weighed 25 pounds
  - Driving Out 1.5 pounds (Sculpt With Spars) Quadrupled cost
  - SEER-DFM Able To Accurately Model This
  - Answers Questions Such As “How many do you have to produce before a process makes sense?”
  - Macro Level “H” models” Can’t Answer Such Questions Without Infinite Calibrations And Data Often Not Available

# DCMC Boeing Seattle Comments On Using The SEER-DFM Parametric Approach:

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- **This Is What We Are Looking For. It simplifies The negotiation. The Parameters Define The Part. Easier to negotiate change**
  - SEER-DFM breaks down to detail so both sides think it is fair
  - Works For Simple Manufacturing Processes & Complicated Parts & Processes
  - Using SEER-DFM They Tradeoff Of Specific Materials, Processes, Fasteners, Stiffeners, Assembly, Even That Don't Impact The Weight
  - All Cost Relationship Data Resides in SEER-DFM
- **Government Audits The Parts, Process, Assembly, Specifics, Not \$ Just Per Pound**
- **Tradeoffs Are Performed Based On Specific, Controllable Variables (SEER-DFM Parameters)**

# Lessons learned

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- **Part of the Process Is To Obtain Buy-In From Both Government and Contractor IN Advance of Use In Negotiation**
- **Use The Right Type of Parametric Model For The Job At Hand**
- **Many Times an “H” Model Will Be Sufficient**
  - When Part Has Been Done Before
  - When There Is No Change In Environment
  - When The Production Issues Are Simple/Expected
  - When Specific Engineering Tradeoffs Are Not Needed
- **Other Times Complex Operations For Parts Will Require A Part/Process/Assembly Model Like SEER-DFM**
  - When The Part Has Unusual Complexity I.E.
    - Specific Assembly Challenges
    - Custom Manufacturing Processes
    - When Should Cost Means Find A Lower Cost